

**PATENT APPLICATION PAPERS
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FOR: A NOVEL PANELING SYSTEM

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This invention relates to a novel wall paneling system and to a method for its assembly.

More particularly, this invention relates to wall panels which are configured to be joined to any number of like-configured panel pieces via a 5 unique interlocking arrangement.

This invention can be used to create panel assemblies of all types; however, it is especially suitable for use in elevators whose sides are framed. Also, it can be secured directly onto studs without the need for an underlying drywall.

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BACKGROUND OF THE INVENTION

There are several known systems for creating wall panel assemblies in homes, offices and elevators.

Systems which are most commonly used in elevators include, for 15 example:

- (1) Panels secured to a support structure by the use of Z-clips;
- (2) Panels which are adhesively secured to a wall, including walls fabricated from extruded aluminum supports; and
- 20 (3) Panels which employ an extruded spline-type fastening system.

Walls constructed with permanence as, for example, walls in homes and buildings, usually employ a drywall secured to studs. Once the drywall has been put in place, paneling, plaster or other coverings such as paint, may be used to enhance its appearance.

The present invention is an improvement over known systems because it provides for panels which can be interlockingly joined to one another, and to a support structure, including drywall, with relative ease. Moreover, this invention allows a user to remove individual panels and/or disassemble the 5 entire system with a facility that is not possible with known systems.

OBJECT OF THE INVENTION

It is an object of this invention to provide panel pieces which can be interlockingly joined to one another so as to create a paneling system which is 10 convenient, secure and easily disassembled.

A preferred object provides for the paneling of elevators where panel pieces are usually large and installation is labor intensive. The present invention overcomes these difficulties by providing panels whose interlocking abilities make it possible for an installer to assemble large panels with a 15 facility and economy which was not heretofore possible.

SUMMARY OF THE INVENTION

The panel pieces of this invention are joined to one another by the unique interlocking engagement of their respective end segments and they 20 can be secured to any type of support structure as, for example, an existing wall, a wall frame, wall studs or the like. Moreover, the panels may be joined to one another in a horizontal arrangement, a feature which makes them uniquely suitable for installing wall panels in an elevator.

In its broadest aspects, the panels of this invention are equipped with opposing end segments which matingly engage the like-configured segments of an adjacent panel piece. Each panel piece is comprised of a front side, a rear side and opposing edge faces which interlockingly engage the edge 5 faces of a like-configured panel. In this embodiment, an edge face is formed to include an elongate projection or tongue and an opposing edge face is formed to contain an elongate recess or groove.

Moreover, it is a feature of this invention that the depth of the recess be of such dimension as to exceed the length of the projection.

10 As a result, the panel pairs will combine in such manner that the projection end of one panel does not come into contact with the recessed base of the adjoining panel and there is formed instead (between the projection end and recessed base) an elongate space which extends inwardly from the respective ends of each opposing side face. This elongate space is 15 sometimes referred to hereinafter as an accent line.

Accordingly, it will be seen that a point of novelty in this invention lies in the configuration of each panel's opposing edge face. These edge faces are configured to matchingly engage the edge faces of like-configured panels so that they can be joined to one another to create a panel system.

20 Conversely, a paneled system can be disassembled by simply withdrawing the panel pieces one from the other.

According to one embodiment of this invention, the opposing faces of each panel are a tongue and groove and adjacent panels are joined to one

another by bringing into engagement the tongue of one panel with the groove of an adjacent panel.

In this tongue and groove arrangement, it is essential that the groove be greater in depth than the length of the tongue so that the joining of one 5 panel to another will result in an elongate space or accent line where the panel pieces engage one another.

In this assembly, the tongue and groove configuration may appear on a panel piece as one pair only, that is, on opposing sides of a panel or, alternatively, they may exist in tandem, that is, opposite one another, on all 10 four sides of the panel piece. An illustration of this tandem arrangement is illustrated in the drawings in Figure 10.

Another embodiment provides for a panel assembly in which the panel piece is characterized by a single tongue on one edge and a single groove on the opposing edge. In this embodiment, the panel piece is also comprised of 15 a front side, a rear side and a pair of opposing edge faces for interlockingly engaging the edge faces of a like-configured panel; one edge face being a tongue and the second edge face being a groove which is defined by a rear leg, a front leg and a base member, with the proviso that the rear leg be greater in length than the front leg.

20 The tongue and groove have predetermined lengths and depths such that the depth of the groove is greater than the length of the tongue, as a result of which, in their assembled mode, a space is formed *in situ* between the tongue end and the base of the groove.

Still another embodiment provides for a panel piece in which the opposing edge faces are characterized by beveled recesses which are intended for matching engagement with the beveled faces of a second panel piece.

5 In this arrangement, the panel is also comprised of a front side and a rear side; however, the two opposing edge faces are formed with beveled edges, one edge face being formed with a beveled recess which extends from one side of the panel piece to the other; this recess being defined by a projecting first flange whose outer wall is coextensive with the rear side of the
10 panel piece.

A second opposing edge face also contains a beveled recess which matches the beveled recess of the first edge face; this recess is defined by a projecting flange, the length of which is greater than that of the first flange so that in joining together two panel pieces there is formed between the
15 adjoining panels an elongate space or accent line.

The virtue of this invention resides in the elimination of that cantilever force effect, which is associated with known panel systems. This cantilever effect results when the tongue end of one panel comes into contact with the base of the groove in an adjoining panel. The present invention eliminates
20 this cantilever effect by transferring the exerted force onto the rear leg and shoulder of the adjoining panel pieces. The result is a shear force which distributes itself evenly onto the abutting portions of the joined panels and, also, onto the fastening means employed. As a result, the integrity of the

panels is enhanced and they are less likely to fracture.

Also, in this arrangement, the assembled panels are not rigidly held and, instead, they are flexible and have the ability to shift slightly and thus avoid splitting. Moreover, when the panel pieces of this invention are
5 attached to a support structure by screw means, they are removable and can be easily replaced.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is perspective view showing the paneling assembly of this
10 invention installed in an elevator (in phantom).

Figure 2 is fragmentary isometric view of two unassembled panel pieces one of which is secured to a support structure.

Figure 3 is a cross-sectional assembled side view of the panel pieces shown in Figure 2 taken along line 3-3.

15 Figure 4 is a fragmentary perspective view of a top panel piece shown with fastening devices in various stages of engagement.

Figure 5 is a cross-sectional side view of the top panel piece of Figure 4 taken along line 5-5.

20 Figure 6 is a fragmentary perspective view of a bottom panel piece shown with fastening devices in various stages of engagement.

Figure 7 is a cross-sectional side view of the bottom panel of Figure 6 taken along line 7-7.

Figure 8 is a fragmentary perspective view of a panel piece equipped

with a Z-clip fastening device.

Figure 9 is a cross-sectional side view of the panel piece and Z-clip device of Figure 8 taken along line 9-9.

Figure 10 is a partial isometric view of a panel piece being inserted into a
5 panel assembly.

Figure 11 is a fragmentary isometric view of two unassembled panel pieces in which the opposing edge faces are beveled.

Figure 12 is a cross-sectional assembled side view of Figure 11 taken
along line 12-12.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 illustrates an exemplary wall paneling assembly **10** in accordance with this invention. As shown, a plurality of panel pieces are provided, each having four edges, the top edge of which includes a groove and the bottom edge, an accommodating tongue. This tongue and groove arrangement and the assembly of the individual panel pieces is discussed hereinbelow in detail and it is further illustrated in Figures 1-3 and Figures 10-
15 13.

Included in the wall paneling system of Figure 1, are molding pieces
20 which can be added to the assembled panels as a finishing touch to enhance the visual effect. A typical top molding piece **4** includes a tongue that is inserted into the groove of a topmost panel **2** (Figure 1).

In the same manner, a bottom molding piece **6** having a flat surface

and equipped with an accommodating groove can be used as a base member and fitted into the tongue of a bottom panel **8** (Figure 1).

In this assembly **10**, the panel pieces of each wall terminate at their respective corners some small distance from one another and they form that space which is shown as **12** in Figure 1. The object of space **12** is to make allowance for any shifting or movement in the support structure. Moreover, it has been found, in practice, that installation is facilitated when adjoining walls are not so closely fitted as to abut against one another.

In their assembled mode, the panels of this invention exhibit those accent lines which are shown as **14** in Figure 1 and they are registry with the accent lines of adjacent panel pieces; however, this is an optional feature and, in practice, the accent lines **14** can be made virtually invisible by bringing the panel pieces into abutting contact.

The panel pieces of this invention may be mounted onto any suitably secure structure, solid or framed. Typical of such structures are, for example, stationary walls, elevator walls or the like.

In addition, the panel pieces may be attached to the framework of a stationary wall, an elevator wall, or the like, or the panel pieces can be attached to wall studs. The panel pieces may also be used as a cover to hide gaps in a wall. It will be appreciated, therefore, that the paneling assembly of this invention is not limited to any particular form of wall structure.

Figures 2 and 3 illustrate that embodiment in which assembly is achieved by inserting the elongate projection or tongue **20** of one panel **18**

into the elongate recess or groove 22 of a like panel 16. As shown in Figures 2 and 3, a typical panel piece consists essentially of a front side 24, a rear side 26 and two accommodating edge faces which can be interlockingly joined to a like panel.

5 One edge face is in the form of an elongated projection or tongue 20 which extends longitudinally from the rear side 26 of the panel piece 16 so that the rear wall of the tongue is coextensive with the rear wall of the panel 16. The opposing panel edge is an elongated recess or groove 22 defined by a rear leg 28, front leg 30 and the recessed base member shown as 32 in
10 Figure 2. The rear side of leg 28 is also coextensive with the rear wall of the panel piece 16 and its dimensions are such that the length of the rear leg 28 is greater than that of leg 30.

In general, assembly is achieved by securing a first panel to a wall or similar support structure and mating it to a second panel piece and this
15 process is repeated with any desired number of panel pieces.

The installation of a typical paneled assembly is described with particularity hereinbelow by making reference to a wall as the support structure. Also, screws are described as the fastening means; however, the reference to a 'wall' and 'screw means' is for illustration only and those skilled
20 in the art will appreciate that any suitable support and any suitable fastening means may be substituted therefor without departing from the spirit or scope of this invention.

Typical of those fastening means which may be employed include, for

example, nails, clips, rivets, staples or adhesives and the like.

In practice, in a typical installation, the panel pieces are placed one atop the other and secured to a wall by screws which are inserted through preformed apertures. Once this has been done, a second panel piece **18** is
5 laid against the first and its tongue is snugly inserted into the mating recess or groove **22** of the first panel piece **16**.

The tongue is neatly received by the groove but it is significant to note that the only interface which occurs is a mating of flange **36** with shoulder **38** and the engagement of the two panels' respective sidewalls, that is, the
10 sidewall **56** of tongue **20** and the front sidewall of recess **22**.

Equally significant is the fact that the depth of recess **22** is greater than the length of tongue **20** and no contact occurs between the terminal ends of their respective edge faces; instead, the base of the tongue **42** and the base of the groove **32** are separated from one another by that area or space which
15 is shown as **44** in Figure 3.

The space **44** is significant because it serves to separate the tongue end of one panel from the groove base of a matching panel and thus avoids that cantilever force which is associated with prior art paneling systems, that is, the force which results when the tongue end of one panel comes into
20 abutting contact with the groove base of an adjoining panel. In the present invention, the assembled panels rely for their support on the contact between flange **36** of panel **16** and shoulder **38** of panels **18**. This contact and the shear force absorbed by the mounting screws **34** virtually eliminates the

cantilever force effect associated with existing panel structures.

In addition to improving on existing panel systems, the present invention also affords an improvement in aesthetics and design. This is seen when two panels are joined together, in the manner described hereinabove, 5 that is, one atop the other, in which event their adjoining front faces form an elongate space which, in the completed assembly gives the appearance of an accent line **14**. This accent line can also be enhanced by using contrasting color schemes as, for example, by coloring the panel surfaces with light hues and using darker tones or the color black to highlight those elongate areas 10 which form the accent line **14**.

Although size is not important, it is critical to this invention that the rear leg **28** of each panel (Figure 2) be of such dimension as to exceed that of tongue **20** and that the distance which is defined by the underside of flange 36 and the terminal end **46** of tongue **42** (Figure 2). This parameter is shown 15 as "d" in Figure 2.

The rear leg **28** also serves as the mounting means for securing the panel pieces to a wall or other support structure. Accordingly, the rear leg must provide sufficient surface area for forming apertures to accommodate mounting screws or nails or the like.

20 If screws or nails are employed, their heads are conveniently covered by the tongue **20** of an adjoining panel piece as shown in Figure 3.

Also shown in Figure 3, is a top molding piece **48** fitted into tongue **50** of an accommodating panel as a finishing piece. This is an optional feature

but, if omitted, the screws 34 would, under normal conditions, be hidden from view by the front leg of the top panel piece 18.

Also shown in Figure 3 is a flat edged bottom panel 52 which is installed as a finishing piece so as to bring the bottom panels into registry with 5 the floor surface.

The following two paragraphs describe a typical embodiment for installing the paneling assembly of this invention onto a wall.

A panel having a flat bottom edge 52 is placed on the floor of the room which is being paneled adjacent to the wall 54 (Figure 3) and a screw 34 is 10 driven through a screw hole (not shown in Figure 3) of the rear leg of the panel piece. The panel pieces which are being attached to a wall are positioned in such manner that the screw holes are in registry with the frame or studs in the wall structure.

A second panel piece, shown in Figure 3 as item 16, is attached to the 15 bottom panel piece 52 by fitting the tongue 26 of the latter into the groove 24 of the former, and this attachment means is repeated for all subsequent panel pieces until the room is fully paneled. Thereafter, a molding piece 48 is attached to the topmost panel 18 by inserting the tongue 50 of said molding into the groove of the panel.

20 Figures 4 and 5 illustrate an alternative means for securing the panel pieces to a support structure. In this embodiment, the topmost panel piece 60 is secured to a wall 62 by the use of clips 64.

As illustrated in Figure 4, the top panel piece 60 is defined by a flat

surface **66** into which has been formed slotted openings **68** for receiving the hook ends **70** of the clip which is to be inserted. Also included in the clip **64** is an elongated slot **72** through which a screw **74** can be driven for mounting the clip and panel to a wall **62**.

5 As shown in Figure 5, the rear side of panel **60** also includes a recess **72** for receiving the clip **64**. This recess **72** allows the top panel piece **60** to lay flush against the wall **62**.

Although two clips are shown in Figure 5, the number used for each panel piece may vary depending on the size and weight of the panel.

10 Figures 6 and 7 illustrate the use of clips **80** for attaching a bottom panel piece **82** to a wall **84**. In this embodiment, the clip **80** contains a plurality of screw holes **86** and **88**. The bottom surface **90** of the panel **82** is flat and includes slotted openings **92** and **94** for receiving the hook ends **96** of the clip **80**. In practice, the clip **80** is secured to the wall by means of screws **98** and **100** which are inserted through the screw holes **86** and **88**.
15 Thereafter, the bottom panel piece **82** is inserted onto the clip **80** and the hook member **96** of the clip **80** is inserted into the slotted opening **94**.

In this embodiment, the bottom panel piece **82** is in close proximity to the floor **102** so as to make allowance for clip **80**. Also, the rear side of the **20** panel **82** includes a recess **104** into which the projection of the clip **80** may be fitted. The recess **104** allows the panel to lay flush against the wall **84** when placed over the clips **80**.

Although two mirror clips **80** are shown in this embodiment, the number

of clips may vary depending on the size and weight of the panel piece **82**.

Figures 8 and 9 illustrate the use of a Z clip **110** for attaching a top panel piece **112** to a wall **114**. This Z clip **110** is attached to the panel piece **112** with the open end of the Z clip **110** facing downwards. A second Z clip **116** is attached to the wall **114** with its open end facing upwards. These Z clips **110** and **116** are attached to the panel piece **112** and the wall **114** by screw means **118**.

To achieve assembly, the open end of Z clip **110** is mated to the open end of Z clip **116**. Also, in this assembly, it is to be noted that a recess **120** is formed into the rear side of the panel piece **112** so that it may accommodate the Z clip and at the same time, lay flush against the wall **114**. Again, the number of clips **116** employed will vary depending on the size and weight of the panel piece **90**.

Another embodiment of this invention is illustrated in Figure 10, which shows a panel piece **130** containing two tongues **132** and two grooves **134** located on the top and left edge of the panel piece. The grooves **134** each contain a rear leg **136** and a front leg **138**. The tongues **132** are located on adjacent edges of the panel piece **130** and the grooves **134** are located on the adjacent edges of the same panel piece **130** opposite the edges containing the tongues **132**. It is to be understood that such an arrangement is exemplary and the number and placement of the tongue/groove combinations is discretionary.

The panel pieces **130** in this embodiment provides for the tongue and

groove attachment of panel pieces in a horizontal as well as vertical arrangement so that a wall which is much larger than the individual panel pieces may be covered. In its assembly, the tongues 132 are inserted into the grooves 134 of previously assembled panel pieces 130 and screws 140 5 are threaded into accommodating screw holes 142 in the rear leg 136 of the panel piece 130. Thereafter, the tongues 132 of additional panel pieces can be inserted into the screwed-in grooves 134 of the previously attached panel pieces.

While the size of the panel pieces 130 is discretionary, a wall paneling 10 assembly that utilizes both horizontal and vertical tongue and groove members will usually employ panels 130 whose length is greater than their height.

Another embodiment of this invention provides for a panel piece whose opposing edge faces are beveled to accommodate the matching edge face of 15 a like-configured panel.

When such a panel is mated with the face of a second like-configured panel, their respective beveled recesses fit neatly one into the other and a mating of the panel pieces is achieved. This embodiment is illustrated in Figures 11 and 12.

As shown in Figures 11 and 12, the panel piece 150 is defined by a front side 152, a rear side 154 and an edge face having a beveled recess 156. The beveled recess 156 of this edge face, extends from one side of the panel piece to the other and it is defined by a projecting flange 158 whose

outer wall is coextensive with the front side 152 of the panel piece 150.

The mating of one panel piece to another is achieved by mating the beveled recess of panel piece 150 with the beveled recess of a second panel piece 160. The edge face of this second panel matches the beveled recess 5 formed in the edge face of the first panel piece 150 and it is defined by a projecting flange 162 whose outer wall is coextensive with the rear side of the panel piece. This projecting flange 162 is greater in height than that of flange 158 so that when the respective recesses of both panel pieces are assembled (Figure 12), an elongate space is formed between the end member of flange 10 158 and the shoulder 166 of panel 160.

The interrelationship between the beveled recesses of the joined panel pieces results in a firm fit; however, the feature which is most critical to this assembly lies in their respective flange members 158 and 162. As shown in Figure 12, the bottom side of flange 158 does not engage the shoulder 166 of 15 panel piece 160, as a result of which, an elongate recess or space is created between these two panel pieces.

This elongate space is an accent line and it also has the salutary effect of eliminating that cantilever force which is associated with known panel assemblies. Instead of a cantilever force, the adjoined panel pieces fit neatly 20 at their beveled recess faces and this match converts the cantilever effect into a shear force which is distributed evenly over the full extent of the opposing edge faces.

In another embodiment of this invention, the panel pieces of the wall

paneling assembly contain a covering. This covering may be plastic laminate, glass, stone, sheet metal, stainless steel, brass, paint, marble, veneer or a solid surface material such as Corian®. Also, while the actual panel pieces can be derived from any source, the preferred materials are plywood, 5 flakeboard and foam.

In yet another embodiment of this invention, the rear of the panel pieces is laminated with a backer sheet.

Any wall may be paneled by the wall paneling assembly and system of the current invention. The wall may be solid, such as plasterboard, or it may 10 be a frame, studs or some combination thereof or the like.

This invention has been described by reference to precise embodiments, but it will be appreciated by those skilled in the art that this invention is subject to various modifications, and to the extent that those modifications would be obvious to one of ordinary skill, they are considered 15 as being within the scope of the appended claims.